

REMARKS

Favorable reconsideration of this application, in view of the present amendment and in light of the following discussion, is respectfully requested.

Claims 1-16 are pending. In the present amendment, Claims 1, 3, 7, 9, and 10 are currently amended and new Claims 13-16 are added. Support for the present amendment can be found in the original specification, for example, at page 17, line 23 to page 19, line 7, at page 26, line 7 to page 27, line 22, and in Figure 1. Thus, it is respectfully submitted that no new matter is added.

In the outstanding Office Action, the specification was objected to; Claims 1, 3-5, and 7-10 were rejected under 35 U.S.C. § 103(a) as unpatentable over Lefevre et al. (U.S. Patent No. 5,334,004, hereinafter “Lefevre”) in view of Jekat et al. (U.S. Patent No. 5,108,715, hereinafter “Jekat”); Claim 2 was rejected under 35 U.S.C. § 103(a) as unpatentable over Lefevre in view of Jekat, and further in view of Steinetz et al. (U.S. Patent No. 5,076,590, hereinafter “Steinetz”); Claim 6 was rejected under 35 U.S.C. § 103(a) as unpatentable over Lefevre in view of Jekat (and Steinetz as necessary), and further in view of Maeda et al. (U.S. Patent No. 4,815,418, hereinafter “Maeda”); and Claims 11 and 12 were rejected under 35 U.S.C. § 103 as unpatentable over Lefevre in view of Jekat, and further in view of Colvin et al. (U.S. Patent No. 2,746,684, hereinafter “Colvin”).

Claim 7 is hereby amended to correct a minor informality. Specifically, in the Amendment filed on May 23, 2008, a space was not included between “Claim” and “1.” Thus, this informality is hereby corrected.

In response to the objection to the specification, a new Abstract is hereby submitted to replace the previous Abstract. Support for the new Abstract can be found in original Claim 1 and in the original specification, for example, at page 17, line 23 to page 19, line 7, and in

Figure 1. Thus, it is respectfully submitted that no new matter is added. Accordingly, it is respectfully requested that the objection to the specification be withdrawn.

Turning now to the rejections under 35 U.S.C. § 103(a), Applicant respectfully requests reconsideration of these rejections and traverses these rejections, as discussed below.

Amended Claim 1 recites, in part, a hot-gas blowing fan, comprising “a collar positioned between the heat insulating layer and the impeller and positioned between the heat insulating layer and the rotating shaft, wherein the collar comprises a different material than the heat insulating layer.”

Thus, Claim 1 is hereby amended to recite a collar. An exemplary embodiment of the collar can be seen in Figure 1. Further, as explained in the original specification, for example, at page 17, line 23 to page 19, line 7, the collar is positioned between the heat insulating layer and the impeller and positioned between the heat insulating layer and the rotating shaft. Thus, the collar prevents material comprising the insulating layer, such as ceramic fiber, from contaminating the gas in the flow path. Accordingly, the heat insulating layer can be made of the ceramic fiber, for example, which has high heat-insulating performance. Thus, the thermal loss of the fuel cell system can be reduced. It is respectfully submitted that the cited references do not disclose or suggest every feature recited in amended Claim 1.

Lefevre describes a compressor for processing a flow of dangerous gas, including a rotor 14 mounted on an end of a rotary shaft 20, and that the shaft is supported by bearings 24.¹ Additionally, Lefevre describes a rotor housing surrounding the shaft 10 and having wet mechanical seals 42, 44 positioned between the rotor 14 and bearings 24.² Further, Lefevre

¹ See Lefevre, at column 3, lines 11-13 and 24-27 and in Figure 1.

² See Lefevre, at column 3, lines 28-37 and in Figure 1.

describes that liquid lubricates the bearings 24 and leaks past the bearings 24 toward the annular chamber 12.³

However, it is respectfully submitted that Lefevre does not disclose or suggest “a collar positioned between the heat insulating layer and the impeller and positioned between the heat insulating layer and the rotating shaft, wherein the collar comprises a different material than the heat insulating layer,” as recited in amended Claim 1.

Instead, as can be seen in Figure 1 of Lefevre, a collar is not positioned between the right side of the rotor housing and the rotor 14 or the rotary shaft 20. Additionally, the rotor housing of Lefevre appears to be made of a single material. Thus, the rotor housing could not be made of ceramic fiber since the ceramic fiber may scatter into the flow path of the hot gas. Accordingly, it would be difficult for the rotor housing to achieve high heat-insulating performance and to reduce thermal loss.

Jekat describes an agitator 10 including a vertical shaft 12 having a propeller 14 on an end thereof.⁴ Additionally, Jekat describes bearings 18, 20 that support the shaft 12 and that the bearings 18, 20 are supported by a housing 22.⁵ Jekat also describes that in order to prevent leakage from the container 16 into the housing 22, a mechanical seal or end face seal is provided between the shaft 12 and the housing 22.⁶

However, it is respectfully submitted that Jekat does not disclose or suggest “a collar positioned between the heat insulating layer and the impeller and positioned between the heat insulating layer and the rotating shaft, wherein the collar comprises a different material than the heat insulating layer,” as recited in amended Claim 1.

³ See Lefevre, at column 3, lines 53-59 and at column 4, lines 1-9.

⁴ See Jekat, at column 2, lines 33-40 and in Figure 1.

⁵ See Jekat, at column 2, lines 44-48 and in Figure 1.

⁶ See Jekat, at column 3, lines 54-57 and in Figure 1.

Instead, Jekat does not describe a collar positioned between the housing 22 and the propeller 14 and positioned between the housing 22 and the shaft 12. Additionally, the housing 22 of Jekat appears to be made of a single material.

Accordingly, it is respectfully submitted that Jekat does not cure the above-noted deficiencies of Lefevre. Therefore, it is respectfully submitted that the combination of Lefevre and Jekat does not disclose or suggest every feature recited in amended Claim 1. Thus, it is respectfully requested that the rejection of Claim 1, and all claims dependent thereon, as unpatentable over Lefevre in view of Jekat be withdrawn.

Amended Claim 3 recites, in part, a hot-gas cooling fan, including “a collar positioned between the heat insulating layer and the impeller and positioned between the heat insulating layer and the rotating shaft, wherein the collar comprises a different material than the heat insulating layer.”

Accordingly, for at least the reasons discussed above with respect to Claim 1, it is respectfully submitted that the combination of Lefevre and Jekat does not disclose or suggest every feature recited in amended Claim 3. Thus, it is respectfully requested that the rejection of Claim 3, and all claims dependent thereon, as unpatentable over Lefevre in view of Jekat be withdrawn.

Turning now to the remaining rejections in the Office Action, Applicant respectfully submits that none of the remaining secondary references (Steinetz, Maeda, and Colvin) cure the deficiencies noted above with respect to Lefevre and Jekat. Therefore, for at least the reasons discussed above, it is respectfully submitted that Claims 2, 6, 11, and 12 also patentably define over all the cited references. Thus, it is respectfully requested that the rejections of these claims be withdrawn.

New Claims 13-16 are added by the present amendment. Support for new Claims 13-16 can be found in the original specification, for example, at page 17, line 23 to page 19, line 7, and in Figure 1. Thus, it is respectfully submitted that no new matter is added.

It is noted that new Claims 13-16 depend on independent Claims 1 and 3, respectively. Thus, it is respectfully submitted that new Claims 13-16 patentably define over the cited references for at least the reasons discussed above with respect to Claims 1 and 3.

Further, new Claim 13 recites, in part, “no liquid contacts the rotating shaft between the impeller and the bearing closest to the impeller.” As discussed above, Lefevre describes that liquid lubricates the bearings 24 and leaks past the bearings 24 toward the annular chamber 12. Additionally, Jekat describes that lubricant is circulated within the interior space 86 of the housing 22.⁷ Thus, it is respectfully submitted that new Claim 13, and new Claim 15 which recites similar features, further patentably define over the cited references.

New Claim 14 recites, in part, “wherein the collar and the cooling portion provide a path for gas from the heat resisting impeller to travel to the bearing without a seal positioned between the impeller and the bearing.”

As discussed above, Lefevre describes two seals (42, 44) positioned between the rotor 14 and the bearings 24. Further, Lefevre describes that the fluid is intended to contact the bearings 24 and to leak past the bearings 24 toward the annular chamber 12. Thus, the gas from the rotor 14 described in Lefevre cannot travel on a path to the bearings 24.

Additionally, as discussed above, Jekat describes that a mechanical seal or end face seal is positioned between the propeller 14 and the bearings 18, 20. Further, Jekat describes that the seal prevents leakage from the container 16 into the housing 22. Thus, the gas from the propeller 14 described in Jekat cannot travel on a path to the bearings 18, 20.

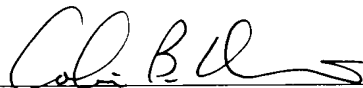
⁷ See Jekat, at column 5, lines 31-33 and in Figure 1.

Thus, it is respectfully submitted that new Claim 14, and new Claim 16 which recites similar features, further patentably define over the cited references.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application and the present application is believed to be in condition for formal allowance. A Notice of Allowance is earnestly solicited.

Respectfully submitted,

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